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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/823,754	04/03/2001	Young-ho Ahn	Q61477	9101

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EXAMINER	
PATHAK, SUDHANSHU C	
ART UNIT	**PAPER NUMBER**
2634	

DATE MAILED: 12/13/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/823,754	AHN, YOUNG-HO	
	Examiner	Art Unit	
	Sudhanshu C. Pathak	2634	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *November 10th, 2005*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-12* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,2 and 5-12* is/are rejected.

7)☒ Claim(s) *3 and 4* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *April 3rd, 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. Claims 1-to-12 are pending in the application.

Response to Arguments

2. Applicant's arguments filed on November 10th, 2005 have been fully considered but they are not persuasive.

In regards to the preliminary matter as to the Finality of the previous Office Action, the examiner maintains (and also was disclosed in the "Response to Arguments" of that Office Action) that the rejection of the claims did not change, and the Dieterich reference was used to show an explicitly the limitation of computing the difference between the correlation values even though this was presented in the Teng reference. However, the examiner has withdrawn the finality of the **previous** office action.

In to the argument that the examiner previous admitted that AAPA in view of Teng does not teach or suggest by determining the difference of the auto-correlation and the cross-correlation, however after further examination of the Teng reference and consultation with a Primary Examiner, it is determined that this limitation is indeed taught in the Teng reference, therefore, AAPA in view of Teng does satisfy the limitation of the claim.

I regards to the arguments presented that the references do not teach adjusting the filter tap length for an adaptive equalizer based on **positions of the farthest pre-/post ghosts** by using the detected multipath information and a field sync signal. This limitation is disclosed in the Applicant Admitted Prior Art (AAPA) which

discloses the received data frame to include a training sequence contained in the field sync signal transmitted from the transmitter (Fig. 1A-B & Specification, Page 2, lines 5-13). The AAPA further discloses an adaptive equalizer used in the receiver for compensation of a channel distortion, such as tilt and ghost wherein the equalizer comprises a filter comprising a number of taps determined by the maximum range of ghosts to be canceled (Specification, Page 2, lines 14-22) wherein one of ordinary skill in the art would recognize that the farthest pre-/post ghosts represent the maximum range of ghosts (multipath signals).

In regards to the arguments presented that the references do not teach detecting multipath (ghosts) information from a **difference between** the correlation values of the input data and a training sequence (cross correlation), and from an auto correlation value of a training sequence. This limitation is disclosed in the Teng reference (5,285,280), which discloses a system, and process for canceling ghosts **(pre-/post ghosts)** in a sampled, received video signal (Abstract, lines 1-2 & Fig. 1a-d). The received ghost canceling reference (GCR) signal and an ideal ghost canceling (GCR) reference signal are inputted into a signal processor and **compared** so as to determine the equalizer coefficient (Column 1, lines 50-68 & Column 2, lines 1-68 & Fig. 2a-c). Teng also discloses that the processor computes the auto-**correlation** of the ideal GCR and the cross-**correlation** of the ideal and received GCR so as to compute the equalizer transversal filter coefficients (Abstract, lines 5-14 & Column 4, lines 25-65). Teng further discloses determining ghost tap coefficient signal, that is implemented by the transversal filter (equalizer), by

comparing the above-mentioned computed auto-correlation and cross-correlation signals (Column 4, lines 25-68 & Column 6, lines 51-68 & Column 7, lines 1-57 & Eq.'s 7-8 & Fig. 11 & Claim 2). Teng also discloses computing the filter coefficients by comparing (dividing) the auto and cross correlation for nearby ghosts (Column 4, Eq. 6) and by **comparing (computing difference)** between the auto and cross correlation (Column 4, Eq.'s 7-8). Teng in the previous specified equations does compute the difference and the division is performed so as to normalize the coefficients which represents the filter coefficients to equalize the detected multipath (ghosts) signals. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention that AAPA in view of Teng indeed discloses all limitations of the claims and further provide the motivations to combine the references.

The Dieterich reference was used in the previous rejection to explicitly disclose a method and apparatus for removing multipath distortion from the video signals wherein the comparing is performed by computing a difference between two signals (Abstract, lines 1-5 & Column 1, lines 5-20) however, this limitation was already disclosed in the Teng reference as disclosed in the above rejection. Dieterich also discloses methods employed for deghosting employ techniques at the receiver for comparing the received test signal and the ideal version of the test signal in order to configure a filter to remove multipath components from the received signal (Column 1, lines 14-18). Dieterich further discloses computing the difference between the received signal and the ideal version of the received signal stored in the receiver so

as to compute the coefficients of the deghosting filter (Column 5, lines 35-68 & Column 6, lines 1-15 & Column 9, lines 55-68 & Fig. 1, elements 30-44 & Fig. 4, element 112).

In regards to the argument that the Whitaker reference does not teach a 704-symbol reference, there is no criticality in the training sequence to be 704 symbols, this is a matter of design choice and depends on the complexity and accuracy desired in a particular application.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 1, 5 & 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over the Applicant Admitted Prior Art (AAPA) in view of Teng et al. (5,285,280).

Regarding to Claims 1, 5 & 7, the AAPA discloses a transmitter and receiver for transmitting and receiving a data frame of a VSB transmission system (Fig. 1A-B & Specification, Page 2, lines 2). The AAPA also discloses the received data frame to include a training sequence contained in the field sync signal transmitted from the transmitter (Fig. 1A-B & Specification, Page 2, lines 5-13). The AAPA further discloses an adaptive equalizer used in the receiver for compensation of a channel distortion, such as tilt and ghost wherein the equalizer comprises a filter comprising a number of taps determined by the maximum range of ghosts to be canceled

(Specification, Page 2, lines 14-22). However, the AAPA does not disclose determining the correlation values (auto and cross) so as to adaptively adjusting the equalizer tap length.

Teng discloses a system and process for canceling ghosts in a sampled, received video signal (Abstract, lines 1-2 & Fig. 1a-d). Teng discloses extracting a received ghost canceling reference signal from the received video signal transmitted through the multipath channel (Abstract, lines 2-5). The received ghost canceling reference (GCR) signal and an ideal ghost canceling (GCR) reference signal are inputted into a signal processor and compared so as to determine the equalizer coefficient (Column 1, lines 50-68 & Column 2, lines 1-68 & Fig. 2a-c). Teng also discloses that the processor computes the auto-correlation of the ideal GCR and the cross-correlation of the ideal and received GCR so as to compute the equalizer transversal filter coefficients (Abstract, lines 5-14 & Column 4, lines 25-65). Teng further discloses determining ghost tap coefficient signal, that is implemented by the transversal filter (equalizer), by comparing the above-mentioned computed auto-correlation and cross-correlation signals (Column 4, lines 25-68 & Column 6, lines 51-68 & Column 7, lines 1-57 & Eq.'s 7-8 & Fig. 11 & Claim 2). Teng also discloses computing the filter coefficients by comparing (dividing) the auto and cross correlation for nearby ghosts (Column 4, Eq. 6) and by comparing (computing difference) between the auto and cross correlation (Column 4, Eq.'s 7-8). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention that Teng discloses a detecting a multipath information by using the auto

correlation, of the ideal GCR, and the cross correlation, of the received GCR and the ideal GCR, computed in the receiver by computing the difference between the auto correlation and the cross correlation for non near ghosts and this can be implemented in the VSB system as described in the AAPA so as to minimize the taps of the equalizer and maintain the accuracy of the receiver.

5. Claims 2, 6 & 8-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over the Applicant Admitted Prior Art (AAPA) and Teng et al. (5,285,280) as applied to claims 1, 5 & 7 above, and further in view of Whitaker (ATSC DTV Receiver Systems; Chapter 17.2; www.tvhandbook.com/support/pdf_files/Chapter17_2.pdf) and further in view of "thefreedictionary.com".

Regarding to Claims 2, 6 & 8-12, the Applicant Admitted Prior Art (AAPA) in view of Teng discloses an apparatus and method for adjusting a filter tap length for an adaptive equalizer comprising a multipath detector for detecting multipath from the difference between the computed the auto-correlation, between the reference training sequence, and cross-correlation, between the reference and the received training sequence, as described above. The AAPA further discloses a data field sync segment comprising 4 sync symbols and 700 symbols of training sequence that are used for determining multipath and used for ghost cancellation in the adaptive equalizer (Fig. 1B & Specification, Page 2, lines 1-13). However, the AAPA and Teng does not disclose a first and second multiplexer for enabling the input data and reference signal when the sync signal is "high".

Whitaker discloses a data field sync detection circuit so as to determine if the field sync signals have been detected on a given data segment, the signal becomes available for use by subsequent circuits (Page 17-70, Fig. 17.2.6 & Page 17-70, Sec. 17.2.2e "Data Field Synchronization"). Whitaker further discloses using 700-symbol training sequence for the equalization process (Page 17-80, Section 17.2.21 "Equalizer Performance using Training Signals" & Page 17-81, Fig. 17.2.15). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention Whitaker teaches implementing a data field synchronization circuit to detect the field sync signal enabling the signal to be further processed, and this can be implemented in the VSB system receiver as described in AAPA and Teng so as to detect the sync symbols to begin the equalization process. Furthermore, there is no criticality to the specific limitation of the training sequence to be of 704 symbols, this is a matter of design choice. However, AAPA and Teng and further in view of Whitaker does not disclose a multiplexer used to implement the selection switching to enable the input data and the reference data.

The "thefreedictionary.com" discloses multiplexer circuitry so as to select a certain signal depending on the "selection" signal (Page 2, Section Digital Circuit Design). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention that "thefreedictionay.com" teaches implementing a switching circuit using multiplexers so as to pass a specified signal depending on a control signal, and multiple of these circuits can be implemented for both the reference signal and input signal as described in AAPA and Teng and Whitaker,

wherein the sync detection circuit output can be used as the control signal, thus satisfying the limitations of the claim. Furthermore, "thefreedictionary.com" serves as the implementation of the multiplexer circuit and the field sync signal comprises a control signal and the data field sync detection circuit as described in Whitaker can be used to detect the sync signal so as to begin processing of equalization as described in AAPA and Teng.

Allowable Subject Matter

6. Claims 3 & 4 objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

7. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sudhanshu C. Pathak whose telephone number is (571)-272-3038. The examiner can normally be reached on M-F: 9am-6pm.

    - If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephen Chin can be reached on (571)-272-3056
    - The fax phone number for the organization where this application or proceeding is assigned is (571)-273-8300.
    - Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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